BUTLER'S SWAMP, CLAREMONT

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The following paper is the result of research carried out by a group of students of Physical Geography at the University of Western Australia. Thanks are expressed to the W.A. Historical Society, to the officials of the W.A. Museum, the Public Library, the Public Works Department, the Metropolitan Water Supply Department, the Lands and Surveys Department and the Land Titles Office, as well as to local residents, who have so kindly assisted during the compilation of the paper.

—J. GENTILLI.

DESCRIPTION

Butler's Swamp is situated approximately six miles south-west of Perth. The southern border is about one mile north of Freshwater Bay (Swan River estuary) and the south-western border is approximately one quarter of a mile north-west of the Claremont railway station. It is bounded on the north, south, east, and west, respectively, by Alfred, Shenton, Davies and Government Roads.

The high-water mark encloses an area of approximately 60 acres. Its greatest length is about 40 chains and the greatest width is 21 chains (high-water surface); but, as will be seen from the accompanying maps, its peculiar shape makes these distances misleading.

The topography of the area may be easily read from the map (Fig. 1) showing the contours. The swamp lies in a valley between coastal sand dunes where the ground rises rapidly from 5 to 40 feet above sea level.

At the north-north-east and south ends of this depression are two valleys, which may or may not have been scoured out by river action. Apart from these two openings the surrounding area is made up of sand dunes of aeolian origin, partly consolidated by low shrub vegetation and intermittent patches of paper-bark trees and wattle.

A geological cross-section of this area shows it to consist of parallel strata of sandstone and sandy clay gently dipping to the west. In the actual vicinity of the swamp there occurs a thin deposit of marl, consisting of detrital material settling out of solution from the swamp waters. The earliest remark on the geology of the area was made in 1844 with reference to the Government Reserve which is described as: "Dense teatree and blackboy thicket. Alluvial deposit of rich black soil about four to ten inches thick, then shell marl six to ten inches thick, then rich unctuous black loam varying in places to light peaty soil under which is coarse sand with water generally fresh."

It is known that marl and stone from the area were used at one time for building purposes and for the making of roads and footpaths in Claremont. But the most precise information is that supplied by the logs of two artesian bores. Bore No. 1 was situated at the south-eastern edge of the area about 200 yards out from the high-water mark. Bore No. 2 was on the north-eastern border.

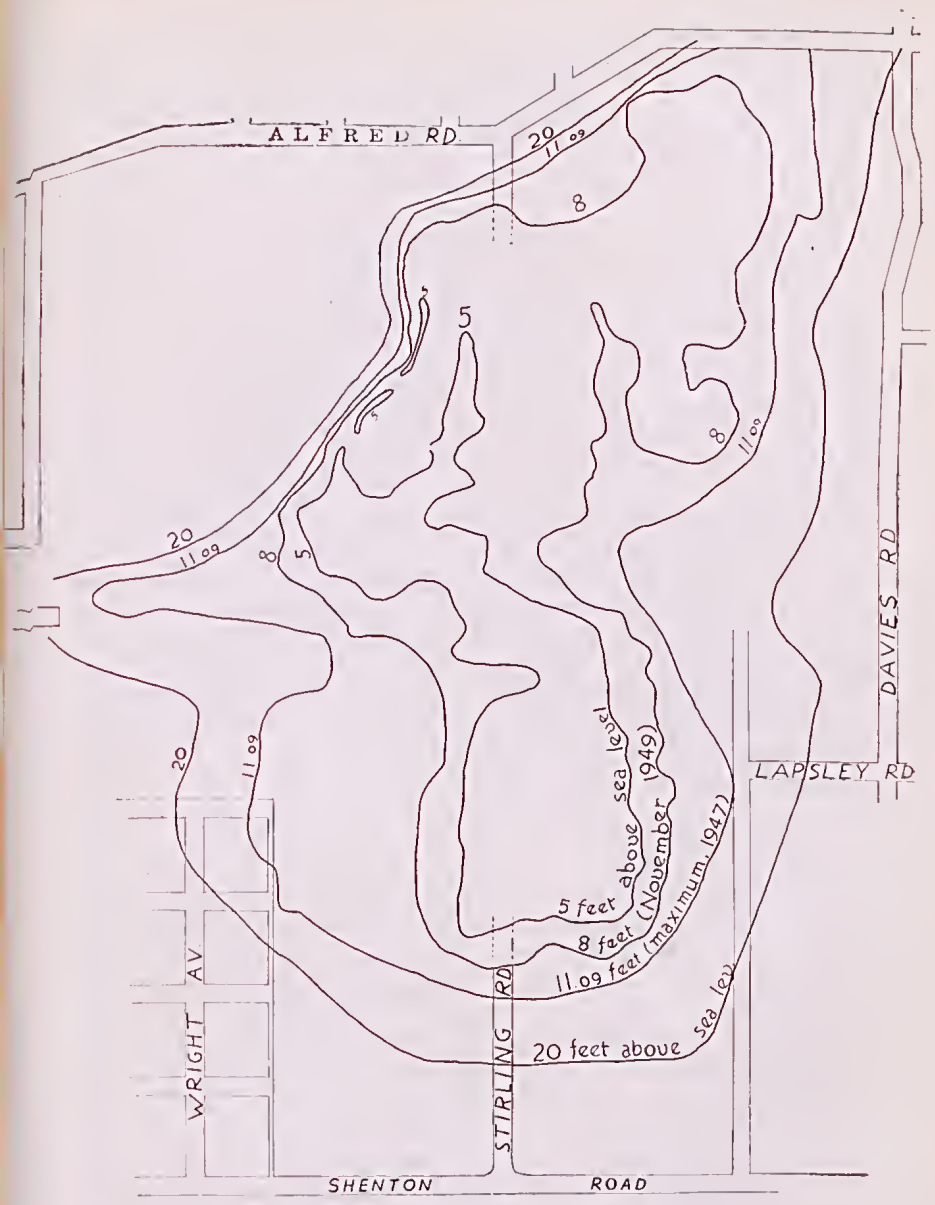

Fig. 1.—THE SHAPE OF THE BASIN. This map shows the contours of 5, 8, 11.09 and 20 feet above sea-level. The 5-foot contour corresponds to the deepest part of the swamp. The 20-foot contour shows the area which is well above flood level. The highest water-level was reached in 1947, when the 11.09-foot contour was just reached by the water. The large area flooded contrasts with the small area under water in November 1949, when the 8-foot level was submerged (Data from map by the Metropolitan Water Supply, Sewerage and Drainage Department).

The description of the strata indicates that there is little similarity between the bores except that there are in both large quantities of drift sand in widely separated levels; these levels do not correspond in the two bores. There is no original rock—the nearest approach being the quartz gravel of bore No. 2 at 560 feet. Both bores tapped an artesian basin with a tremendous flow of water.

ORIGIN OF THE SWAMP

At different times no less than five theories have been put forward to account for the formation of the swamp and the remarkable increase in its water level in the past 30 years. They are mentioned in the order of probability, as discussed by one of our colleagues, Mr. R. D Ives.

The main point of the first theory is that the swamp is a run-off basin which collects the water that falls in the area. It is suggested that this water drains down the sides of the hills and collects in the bottom of the valley as a lake.

However, there is no evidence of any gully or creek running from the surrounding hills into the lake.

The major premise of the second theory is that the swamp is a relic from some tributary of the River Swan. It is suggested that the swamp is the bed of a former river that has not yet completely dried out. To support this hypothesis there is a series of lakes and swamps—namely Butler's Swamp, Herdsman's Lake, Monger's Lake, Lake Karrinyup, etc. Recent changes in its water level show that present-day factors are largely, if not, exclusively responsible for the swamp's existence.

The third theory attributes the origin of the lake and its surrounding marsh to the seepage from one of the bores. Mr. T. Lefroy in a note in *The West Australian* (October 7, 1932) stated that the swamp was caused by the escaping of water from Claremont No. 1 bore that was opened on January 10, 1903. It supplied water to the storage tanks which were situated at the top of Congdon Street, Claremont at the rate of 314,000 gallons daily. At that time, the area was dry land.

In 1920 the bore was closed and sealed with cement. And thus, according to the supporters of the theory, started the seepage which was responsible for the origin of the lake.

This explanation was questioned by Mr. P. V. O'Brien of the Metropolitan Water Supply Department who in *The West Australian* of October 29, 1932 stated that it was most unlikely, as during the period 1903 to 1920 a constant check had been made of the pressure gauges and that as no seepage had occurred in the period of 17 years, when the bore was being worked, he could not see why it should start as soon as the bore was closed down.

Another theory, put forward in 1932, put the blame for the rise in water level to the removal of the dense vegetation cover in the district. However in other areas where a woodland cover still survives there has also been a rise in the water table. It is also difficult to reconcile the fact that most of the clearing in the

Butler's Swamp area was completed long before 1920, during which period there was no appreciable rise in the water level, whereas after 1920 the water table rose fairly rapidly.

The theory accepted in the present paper is that the modern appearance of Butler's Swamp is due to the rising of the water table, which caused the bottom of the depression to assume the aspect of a lake. The cause of this rise "was attributed by the Water Supply Department engineers to a succession of high rainfall years" (D. L. Serventy, *The Birds of the Swan River District*, 1948, p. 16, who gives a general review of the problem).

FLUCTUATIONS OF WATER LEVEL

Generally all the evidence we have been able to assemble suggests that up to the commencement of the rise in the water table (set down by Serventy, *ibid*, p. 16, as about 1918-1920) the Butler's Swamp area held very little permanent water over the period since the State was colonised and that the district was considered suitable for cultivation and other improvements. The early maps of 1844 and 1902, in the Lands and Surveys Department, show that pools of permanent water were to be found only in a few comparatively restricted places. The water table must, however, have been fairly close to the surface. This is evidenced by the fact that ground water in the Claremont No. 1 bore, which is situated on a slight hill, was struck at 25 feet, and by the general presence of abundant paperbark trees (*Melaleuca raphiophylla*).

The records of husbandry during the past century also support the view that reasonably stable conditions, of a sub-swampy character, persisted.

In 1831 John Butler requested "a grant of ten acres of land on the east side of a lagoon one and a half miles from my house in Freshwater Bay." In later correspondence he referred to his holding of 20 acres on the lagoon as an "experiment farm." Official records of Butler's occupancy of the area are lacking and it is possible that he used the land for a considerable period without ever receiving an official grant.

At some time prior to 1851 military pensioners were settled on blocks of between 5 and 10 acres on Butler's Swamp. In a report to the Secretary for War, dated June 11, 1851, the Military Staff Officer in the colony (Captain J. Bruce) stated in reference to the pensioners settled about Freshwater Bay: "Though in some places heavily timbered, the swamp land at Freshwater Bay seems capable of being turned to good account by industry and exertion. . . . In course of time the grants at Freshwater Bay may become valuable farms as the soil is of a description rarely to be met with in this part of the colony."

By the end of the century much of the land was being utilised. A local resident remembers when the area was growing apples, vines, stone fruits and marketable quantities of flowers and vegetables. A dairy—Rowe's Dairy—was situated near the junction of Alfred and Davies Roads. Stirling Road, although flooded in parts

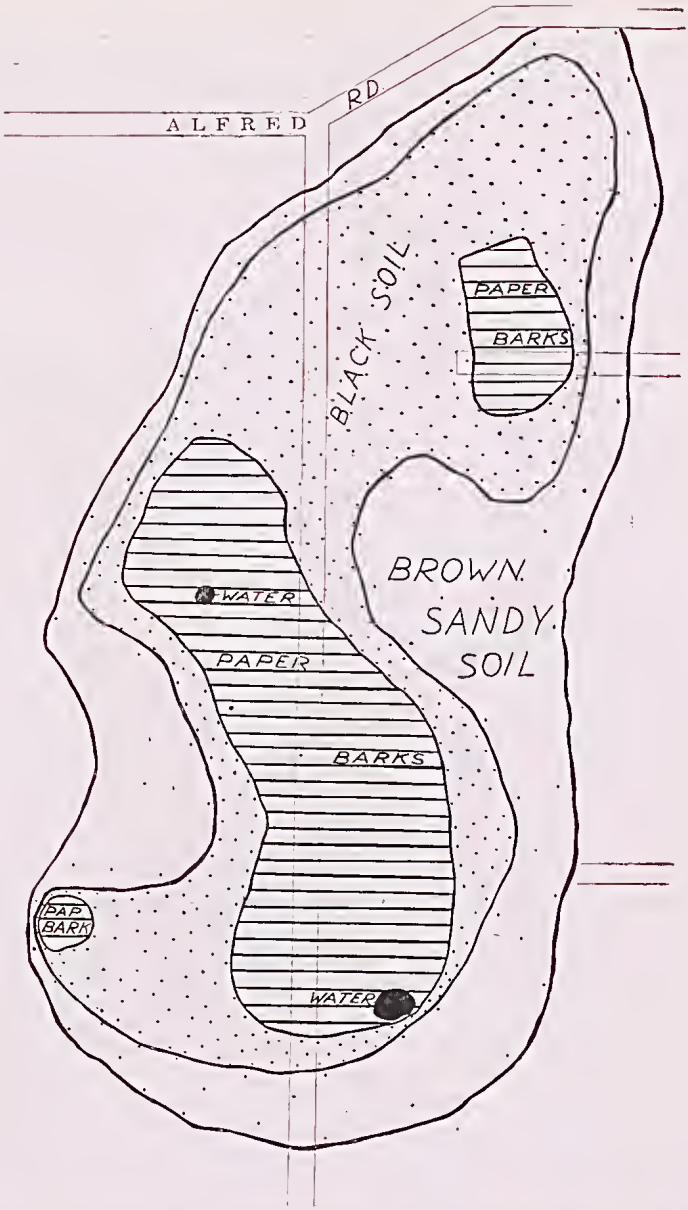

Fig. 2.—THE SWAMP AT THE END OF THE XIX CENTURY. The two small black dots show the only areas permanently under water. Paperbark trees were growing over the dashed areas, which are rather generalised here. Black soil and grass areas are shown by close dots. Sparse dots show the higher slopes, covered with brown sandy soil and supporting blackboys and eucalypts. Stirling Road crosses the swamp from north to south. The conditions shown do not differ substantially from those represented in a map of 1844 (Data from map, 1902, in the Lands and Surveys Department).

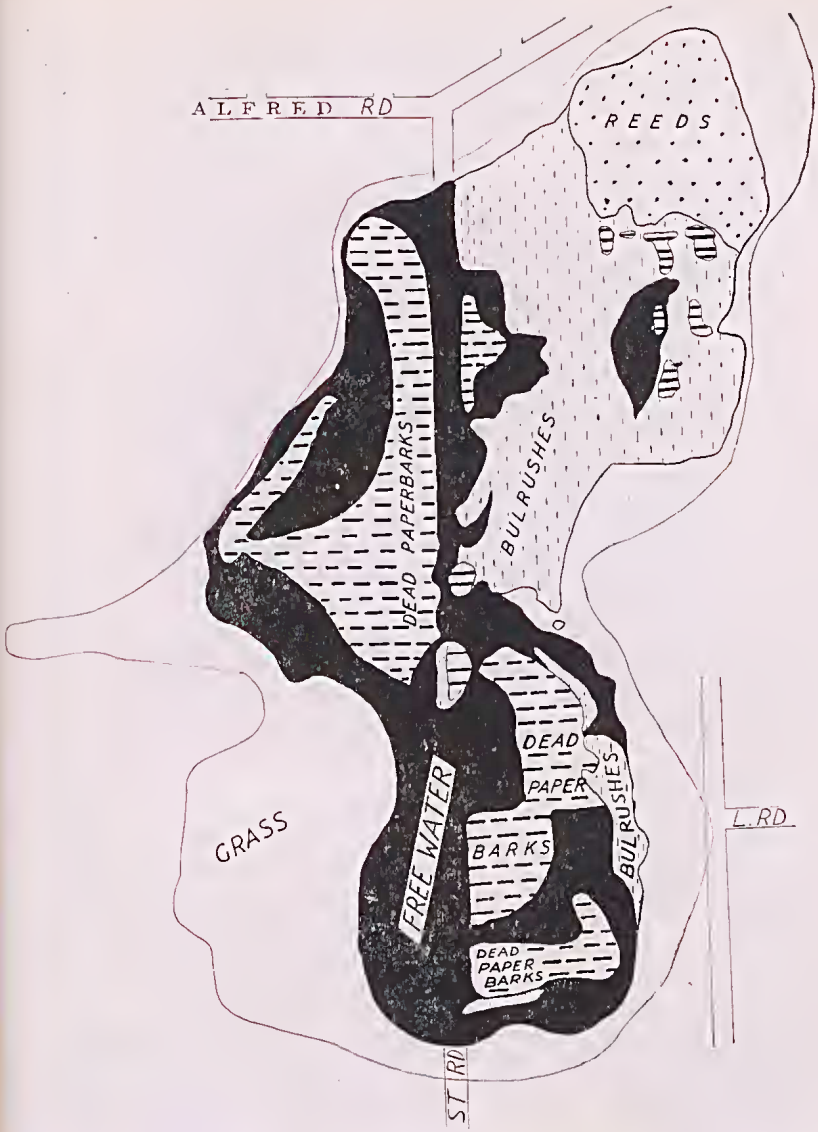

Fig. 3.—THE SWAMP IN THE MIDDLE OF THE XX CENTURY. The areas covered with permanent, open water have greatly expanded, as shown by the complicated pattern of solid black. Very few paperbark trees have survived, in two small patches towards the middle of the swamp and in several very small patches in the north-eastern corner (continuous horizontal lines). Most of the trees shown on Fig. 2 have died (broken horizontal lines). Bulrushes (thin vertical dashes) have grown in the temporarily flooded areas, and thin reeds (dots) have invaded the almost free water surface of the north-eastern corner (Data from field surveys and aerial photographs made available by the Lands and Surveys Department).

in winter, was always traffieable by horse and cart. The south-eastern portion served as a cricket ground, being dry and firm in summer and the locality was used as a camping ground by natives who used to throng there for "Show Week."

The local environment was drastieally altered after 1918-1920. The rising of the water level obliterated most of the cultivation, rendered Stirling Road permanently impassable and profoundly changed the character of the vegetation. The paperbark trees, unable to withstand the permanent submergence died off. The photograph in Fig. 4 taken in 1929, showing the bulk of them still alive, is in striking contrast to present-day conditions (Fig. 5).

The Metropolitan Water Supply, Sewerage & Drainage Department has kept a record of water heights above low water, Fremantle, in several swamps and wells in the metropolitan area. These records show a marked correlation both between the various swamps and wells, and between the rainfall and the height of water.

Water levels in Butler's Swamp varied between 5.37 feet above low sea-level and 11.09 feet above low sea-level during the period of observation, from 1923 onwards. Although the highest level was recorded in 1947, there are records of high levels in earlier years, for instance 9.9 feet in September 1923, 10.1 feet in October 1928, and 10.3 feet in August 1932. A level of 10.5 feet was reached in September 1939. Low levels were recorded between these exceptionally high levels, for instance 6.7 feet in March 1926, 7.3 feet in February 1934, 6 feet in March and April 1939, 5.37 feet in February 1945, 6.03 feet in March 1950.

It is clear that the level of the water-table varies very closely with the amount of rain-water received. During 1939 there was a rise from 6 feet in March and April, to 10.5 feet in September. During 1945 the rise was from 5.37 feet in February, to 9.29 feet in August. On the other hand, during the dry year 1940 the level of the water was 9.30 feet in January, and gradually decreased to 8.40 feet in May, to rise to 8.60 feet in June and July, and then decline again until February 1941.

A complete table of records from 1937 to September 1950 is given hereunder:—

Records of water levels in Butler's Swamp collected by the Metropolitan Water Supply Sewerage and Drainage Department, Perth (expressed in feet above low water, Fremantle).

Month	J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.
Year												
1937	8.10	—	—	—	7.80	8.50	8.60	8.70	8.20	8.50	8.20	7.90
1938	7.3	7.1	7.25	7.35	7.60	7.80	8.00	8.20	7.90	7.80	7.25	7.00
1939	6.50	6.30	6.00	6.00	7.30	8.20	9.20	10.10	10.50	10.40	10.20	9.50
1940	9.30	8.80	8.50	8.50	8.40	8.60	8.60	8.30	7.90	7.60	7.10	6.50
1941	5.90	6.00	6.20	6.50	6.50	7.30	8.00	8.30	8.40	8.20	—	—
1942	—	—	—	—	7.80	8.20	8.44	8.55	8.51	8.25	8.00	7.75
1943	—	—	—	—	—	—	—	—	—	—	—	—
1944	—	6.40	5.66	6.04	7.20	7.49	7.84	7.54	7.17	6.62	6.25	5.87
1945	5.45	5.37	5.54	5.54	6.56	8.95	8.50	9.29	9.27	9.17	8.95	—
1946	7.99	7.49	7.33	8.04	8.66	9.41	10.12	10.43	10.45	10.00	9.83	9.29
1947	8.62	8.17	8.71	8.56	9.45	10.66	10.91	11.09	10.07	11.03	10.41	—
1948	9.20	8.72	8.50	8.58	8.45	9.45	9.57	9.67	9.92	9.45	8.79	—
1949	8.01	7.45	7.37	7.54	7.54	7.83	8.54	8.83	8.29	8.01	7.54	7.27
1950	6.81	6.62	6.03	6.20	8.25	8.71	9.19	9.07	8.99	—	—	—

Fig. 4.—Butler's Swamp looking south along Stirling Road from Alfred Road, August 25, 1929.
—Photo W. Pirrett.

Fig. 5.—Butler's Swamp, the same view on August 16, 1950.
—Photo H. Tarlton Phillipps.

It should be noted that in a past period, prior to white settlement, a high water level, considerably higher than today, must have obtained. This is indicated by the occurrence of a shell marl at a higher level than the present high-water mark of Butler's Swamp.

The facts discussed in this paper, however, show that very important changes in the natural environment may take place within a period of a few years.

LIVING OFF THE LAND

By W. H. BUTLER, Inglewood.

In this article I propose dealing with plant and animal foods available in the bush of the South-west, with some notes on their preparation. All the foods mentioned have been eaten by myself, with the exception of a few which are added on well-supported evidence.

PLANT FOODS

A rule of thumb regarding plant foods is to place a small portion of the plant on the tip of the tongue. If the skin of the lips or tongue is irritated, the plant may be rejected as harmful.

Exotic Species

Watercress *(Nasturtium officinale):* Eat the leaves and stems raw or boiled.

Asparagus *(Asparagus officinalis* var. *altilis):* Eat the shoots raw or boiled before they colour, otherwise there is an unpleasant taste of aniseed. The ferny leaves of the adult plant may be crushed and used as a game lure owing to the aniseed smell. This domestic plant has run wild extensively along the Wooroloo Brook.

Nettle *(Urtica dioica):* Eat the boiled stems, leaves and shoots. Singe the leaves in a flame.

Grasses—Buffalo, Couch and Kikuyu: Eat the underground shoots raw or boiled. Green grass can be boiled and the water drunk. The substance itself is useless as food as the human digestive system cannot deal with the cellulose.

Wild Oats *(Avena barbata)* and Barley Grass *(Hordeum murinum):* Crush the seeds for cereal and boil.

Wild Turnip and Wild Radish: Eat the boiled roots. The young plant centres can be eaten raw or boiled. These species are particularly prevalent along railway lines.

Guildford Grass *(Romulea rosea):* The green seed pods ("puddings") may be eaten raw.

Indigenous Species

Blackboy *(Xanthorrhoea spp.):* Eat the soft white bases of the crown and flower stalks, raw or boiled.

Gum-trees *(Eucalyptus spp.):* Seeds of some, such as the Marri *(E. calophylla)* can be eaten raw. The elastic skin on the young tips can be chewed to relieve thirst.

Banksia *(Banksia spp.):* Eat the young terminal buds raw. Dip the flower cones in water and suck for nectar.